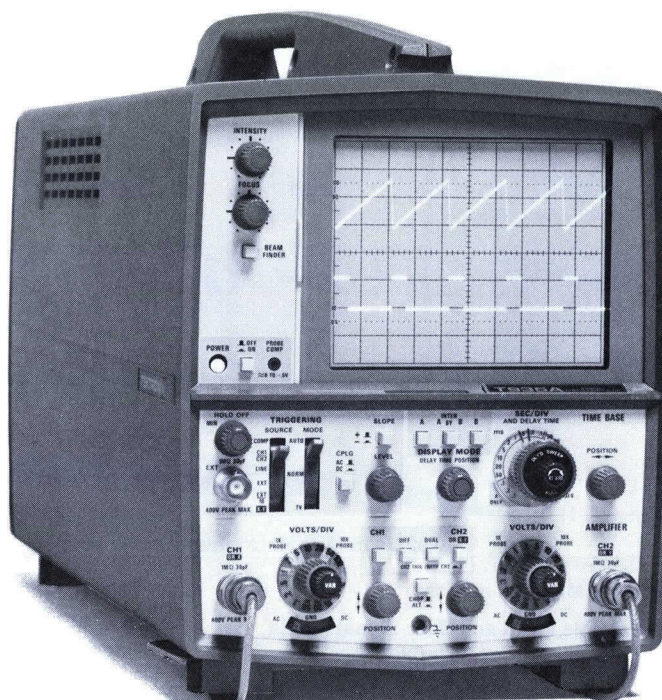


T932A 35 MHz Dual-Trace Oscilloscope



**T932A 35 MHz Dual-Trace Oscilloscope
with Delayed Sweep**

Dc to 35 MHz at 2 mV/cm

Differential Display

Full Sensitivity X-Y

Ac and Dc Trigger Coupling

Composite, Ch 1 or Ch 2 Triggering

Selectable Chop/Alternate

Trigger Holdoff

Meet the two newest members of our T900 Oscilloscope Family — the T932A and the T935A. With these models we've added differential and full sensitivity X-Y capabilities, dc trigger coupling, a composite trigger and selectable chop/alternate display modes to the Tektronix line of low-cost portable oscilloscopes.

The T932A and T935A 35-MHz Dual-Trace Oscilloscopes are designed for cost-sensitive applications that require greater measurement capability than the T921/T922 oscilloscopes offer. Typical applications include design, production-line testing, and servicing of digital equipment such as computer peripherals, point-of-purchase data processors, numerical machine controls and consumer electronics.

Other T932A and T935A features seldom found in moderately-priced oscilloscopes include delayed sweep (the T935A) and trigger holdoff capabilities. Displayed signals that do not reveal sufficient detail on time base A sweep may be selectively expanded using the delayed sweep feature and dis-

played on the B sweep. The trigger hold-off function permits adjustment of the sweep repetition frequency without changing sweep time per centimeter. Both features are valuable measurement aids, especially in digital design and service applications.

When making measurements which require delayed sweep, the T935A is the logical choice. Except for this feature, it is identical to the T932A.

VERTICAL SYSTEM Mode Selection

Ch 1 — Displays only the Ch 1 signal.

Ch 2 — Displays only the Ch 2 signal.

Chop — Displays Ch 1 and Ch 2 signals simultaneously (chop rate 250 kHz), triggers on Ch 1 or Ch 2 signal.

Alt — Displays Ch 1 and Ch 2 signals alternately, triggers on Ch 1 or Ch 2 signal.

Diff — Displays difference between Ch 1 and Ch 2 signal; Ch 2 automatically inverted, trigger signal automatically derived from the Crt display.

Deflection Factor

Range — 2 mV/div to 10 V/div in 12 steps in a 1-2-5 sequence.

Accuracy —
+20°C to +30°C Within 3%
0°C to +45°C Within 4%

Uncalibrated (VAR) Range — Continuously variable between settings. Extends deflection factor to at least 25 V/div.

Frequency Response — Dc to at least 35 MHz (measured at -3 dB).

Rise Time — 10 ns or less.

Chopped Mode Repetition Rate — \approx 250 kHz.

Input Resistance — \approx 1 M Ω .

Input Capacitance — \approx 30 pF.

Max Input Voltage — **Dc Coupled**, 250 V (dc + peak ac) at 1 kHz or less. **Ac Coupled**, 250 V (dc + peak ac) at 1 kHz or less.

Delay Line — Permits viewing edge of displayed waveform.

HORIZONTAL SYSTEM Calibrated Range

A Sweep — 0.5 s/div to 0.1 μ s/div in 21 steps in a 1-2-5 sequence. Variable X1 to X10 magnifier extends max sweep rate to 10 ns/div.

B Sweep — (T935A only) 50 ms to 0.1 μ s/div in 16 steps in a 1-2-5 sequence. Variable X1 to X10 magnifier extends max sweep rate to 10 ns/div.

Accuracy —	Unmagnified	Magnified
+20°C to +30°C	Within 3%	Within 5%
0°C to +45°C	Within 4%	Within 6%

Delay Time Position Range — (T935A only) 0.5 to 10 div (uncalibrated).

Delay Time Jitter — (T935A only) One part or less in 10,000 (0.01%) of ten times the SEC/DIV switch setting.

TRIGGERING Trigger Mode

Auto — Permits normal triggering on waveforms with a repetition rate of at least 20 Hz. Sweep "free-runs" in the absence of an adequate trigger signal, or with a repetition rate below 20 Hz.

Norm — Permits normal triggering. Sweep does not run in the absence of an adequate trigger signal.

Tv — Provides triggering on tv field when SEC/DIV switch is set at 0.1 ms or slower. Triggers on tv line when SEC/DIV switch is set at 50 μ s or faster.

Slope + Out — **In** — Sweep is triggered on the positive/negative-going slope of the triggering waveform.

Level — Variable control selects the amplitude point on the trigger signal when sweep triggering occurs.

Trigger Holdoff — Permits adjustment of time interval between end of sweep and next acceptable trigger to achieve stable displays of complex words.

more on next page.

Coupling

Ac (switch out) — Blocks dc (<60 Hz) component of triggering signal and allows triggering on ac portion of signal.

Dc (switch in) — Passes all components of triggering signal from dc to at least 35 MHz.

Trigger Source

Comp (composite) — Trigger signal is derived from the displayed vertical signal.

Ch 1/Ch 2 (internal) — Trigger signal is derived from either the Ch 1 or Ch 2 signal as described in the vertical mode section.

Line — Trigger signal is derived from the line voltage frequency.

Ext (external) — Trigger signal is derived from the signal applied to the external trigger input.

Ext/10 (external ÷ 10) — External signal is attenuated by a factor of 10.

X-Y — Permits X-Y displays when Ch 2 vertical button is depressed.

Trigger Sensitivity

Auto and Norm —

Ac — 0.5 div internal or 100 mV external from 60 Hz to 2 MHz, increasing to 1.5 div internal or 150 mV external at 35 MHz.

Dc — 0.5 div internal or 100 mV external from dc to 2 MHz, increasing to 1.5 div internal or 150 mV external at 35 MHz.

TV — Composite sync 1 div internal or 100 mV external (about 2.3 div or 230 mV of composite video).

External Trigger Input

Max Input — 400 V (dc + peak ac) 800 V p-p ac at 1 kHz or less.

Input Resistance — $\approx 1\text{ M}\Omega$.

Input Capacitance — $\approx 30\text{ pF}$.

X-Y OPERATION

(Ch 1-X, Ch 2-Y)

Sensitivity — Same as Ch 1 and Ch 2.

Accuracy — 20 to 30°C—5%.
0 to 45°C—6%.

X-Axis Bandwidth — Dc to at least 2 MHz (measured at -3 dB).

Input Resistance — $\approx 1\text{ M}\Omega$.

Input Capacitance — $\approx 30\text{ pF}$.

Phase Difference between X and Y Axis Amplifiers — Within 3° from dc to 50 kHz.

CRT DISPLAY

Display Area — 8 x 10 cm, internal graticule.

Standard Phosphor — P31.

Beam Finder — Locates off-screen displays.

Nominal Accelerating Potential — $\approx 12\text{ kV}$.

PROBE ADJUST

Output Voltage — $\approx 0.5\text{ V}$.

Repetition Rate — $\approx 1\text{ kHz}$.

Z-AXIS INPUT

Sensitivity — 5 V causes noticeable modulation.

Usable Frequency Range — Dc to 5 MHz.

Input Impedance — $\approx 10\text{ k}\Omega$.

POWER SOURCE (AC)

Line Voltage Ranges — HI—LO range accessible externally; 110-120V, 220-240V line selector visible but not accessible externally.

100-120 V Range — HI: 108 to 132 V rms. LO: 90 to 110 V rms.

220-240 V Range — HI: 216 to 250 V rms. LO: 198 to 242 V rms.

Line Frequency — 50 to 60 Hz.

Power Consumption — Watts (max) 36, amps (max) 0.35, at 120 V, 60 Hz.

For environmental performance, weights and dimensions, see T922 information on page 122.

ACCESSORIES

(Included as Standard Equipment)

Probes — 2 each, P6108 general-purpose 10X voltage probe provides full bandwidth capability for either the T932A or T935A.

ORDERING INFORMATION

T932A — Dc to 35 MHz, Dual Trace, Mono Time Base Oscilloscope (Includes Two 10X Probes) \$1155

T935A — Dc to 35 MHz, Dual-Trace, Mono Time Base (with Delayed Sweep) Oscilloscope (Includes Two 10X Probes) \$1435